

CLAIMS

What is claimed is:

1. A vehicle drive system comprising:
a differential assembly;
a planetary gearbox operably coupled to said differential assembly, said planetary gearbox including a first drive member and a second drive member;
a first power source operably coupled to said first drive member to provide a first gear ratio reduction; and
a second power source operably coupled to said second drive member to provide a second gear ratio reduction different than said first gear ratio reduction wherein said first and second power sources selectively drive said first and second drive members together to generate a variable gear ratio under predetermined conditions.
2. The vehicle drive system of claim 1 wherein said first and second power sources operate independently from each other.
3. The vehicle drive system of claim 2 wherein said first gear ratio reduction is higher than said second gear ratio reduction and wherein under predetermined conditions said first drive member comprises a sole drive member and said first power source operates to generate a high output torque via said first gear ratio reduction by driving said first drive member.

4. The vehicle drive system of claim 2 wherein said second gear ratio reduction is lower than said first gear ratio reduction and wherein under predetermined conditions said second drive member comprises a sole drive member and said second power source operates to generate a high output speed via said second gear ratio reduction by driving said second drive member.

5. The vehicle drive system of claim 1 wherein said planetary gear box includes a driven member that is driven by both said first and second drive members.

6. The vehicle drive system of claim 5 wherein said planetary gear box includes a sun gear, a plurality of planet gears in meshing engagement with said sun gear, a planet carrier supporting said planet gears, and a ring gear in meshing engagement with said planet gears.

7. The vehicle drive system of claim 6 wherein said first drive member comprises said sun gear, said second drive member comprises said ring gear, and said driven member comprises said planet carrier.

8. The vehicle drive system of claim 7 including an input operably coupled to said differential assembly and driven by said planet carrier.

9. The vehicle drive system of claim 8 wherein said input comprises a pinion gear directly driven by said planet carrier and a second ring gear operably coupled to said differential assembly and driven by said pinion gear.

10. The vehicle drive system of claim 9 wherein said first power source directly drives said sun gear.

11. The vehicle drive system of claim 9 including an output gear driven by said second power source wherein said output gear drives said ring gear.

12. The vehicle drive system of claim 7 wherein said planet carrier directly drives said differential assembly.

13. The vehicle drive system of claim 12 wherein said differential assembly includes a differential housing that supports a plurality of differential gears and wherein said planet carrier is formed as part of said differential housing.

14. The vehicle drive system of claim 1 wherein said first and second power sources comprise electric drive motors.

15. The vehicle drive system of claim 1 wherein said first and second power sources comprise hydraulic drive motors.

16. The vehicle drive system of claim 1 wherein said differential assembly is operably coupled to drive first and second axle shafts about a lateral axis of rotation and wherein said first and second power sources include first and second output shafts rotating about first and second longitudinal axes of rotation that are transverse to said lateral axis of rotation.

17. The vehicle drive system of claim 1 wherein said differential assembly is operably coupled to drive first and second axle shafts about a lateral axle axis of rotation and wherein said first and second power sources include first and second output shafts rotating about first and second lateral motor axes of rotation that are parallel to and spaced apart from said lateral axle axis of rotation.

18. A vehicle drive system comprising:

first and second axle shafts operably coupled to drive first and second laterally spaced wheel assemblies about a lateral axis of rotation;

a differential assembly operably coupled to drive said first and second axle shafts;

a single planetary gear box operably coupled to drive said differential assembly, said planetary gear box including a sun gear, a plurality of planet gears in meshing engagement with said sun gear, a planet carrier supporting said planet gears, and a ring gear in meshing engagement with said planet gears;

a first power source operably coupled to drive said sun gear to provide a high gear ratio reduction; and

a second power source operably coupled to drive said ring gear to provide a low gear ratio reduction wherein said first and second power sources simultaneously drive said sun gear and said ring gear to generate a variable gear ratio under predetermined conditions.

19. The vehicle drive system of claim 18 wherein said planet carrier drives said differential assembly and is driven by said sun gear and said ring gear via said planet gears.

20. A method for powering a vehicle drive system comprising the steps of:

(a) providing a drive axle assembly including a center differential operably coupled to drive first and second axle shafts, and providing a planetary gear box operably coupled to the differential and including a first drive input member, a second drive input member different than the first drive input member; and an output member driven by both the first and second drive input members;

(b) driving the first drive input member with a first power source to provide a first gear ratio reduction;

(c) driving the second drive input member with a second power source different than the first power source to provide a second gear ratio reduction different than the first gear ratio reduction; and

(d) simultaneously powering both the first and second power sources under predetermined conditions to provide a variable gear ratio input to the differential via the output member.